REMARKS

Claims 1-3 and 19-31 are pending in the application.

The withdrawal of the rejections involving Cooray et al. is noted with appreciation.

Rejection under §103(a) over Asano et al. in view of Prescher at al.

Claims 1-3, 19-23, 26-27, and 29-30 stand rejected under 35 U.S.C. §103(a) as obvious over Asano et al. (JP 11-279258) in view of Prescher at al. (U.S. 6,143,816). Applicants respectfully request reconsideration of this rejection.

Although the present rejection involves Asano et al., not Cooray et al., the Office Action refers to Cooray et al. in this rejection. It is believed that this was accidental, and that the Examiner intended to refer to Asano et al. If this is incorrect, and Cooray et al. was intended to be applied in the rejection, Applicants hereby request an opportunity to respond in the context of a non-Final Office Action.

Turning now to the stated rejection, the Office Action correctly states that Asano et al. does not teach flame retardant filler material such as boehmite and also correctly states that Asano et al. teaches a halogen free epoxy resin formed by reacting an epoxy resin with an organophosphorus compound. More particularly, Asano et al. describes the synthesis of the phosphorus-containing epoxy resin as involving three components:

an epoxy resin containing 20 wt% or more of a novolak epoxy resin,

a quinoline compound, and

(A) an organophosphorus compound having one active hydrogen bonded to phosphorus.

Further examination of the abstract of Asano et al. elicits that

> An organophosphorus compound having two active hydrogen atoms in the molecule is separated from the reaction product from the quinoline compound and (A) and reacted with the epoxy resin. (Abstract, last sentence.)

In other words, Asano requires an organophosphorus compound having two active hydrogen atoms to be used to prepare the phosphorus-containing epoxy resin, and the epoxy resin must contain at least 20 wt% or more of a novolak epoxy resin. In contrast, in the present claims, benefits can be achieved with epoxy resins not containing a novolak epoxy resin, and the phosphorus compounds with which the epoxy resin is advanced are not required to have two active hydrogen atoms.

Regarding the combination of references, Asano et al. and Prescher et al. teach away from each other. The purpose in each reference is different: Asano et al. is directed to laminated boards and uses epoxy resins; Prescher et al. is directed to a filler material for cable sheaths and cable insulation made from plastics such as polypropylene and polyamide (column 2, lines 11-14). In addition, Asano et al. does not disclose or suggest any aluminum oxide or hydroxide, much less boehmite. Prescher et al. does not teach or mention phosphorus compounds of any sort. Thus Asano et al. and Prescher et al. are directed to different applications (laminated boards v. cable sheaths and cable insulation) as well as employing different materials to achieve these ends (epoxy resins v. plastics, such as polypropylene and polyamide). Since these references use different materials for different purposes, there would have been no reason for one of ordinary skill in the art to combine them, and even if combined, would not have made the present claims obvious. Therefore, the disclosures of Asano et al. and Prescher et al. strongly discourage their combination. A reference is prior art for all that it teaches. *Beckman Instruments v. LKB Produkter AB*, 892 F.2d 1547, 1551, 13 U.S.P.Q.2d 1301, 1304 (Fed. Cir. 1989).

Further, Prescher et al. teaches that the aluminum hydroxide (boehmite) therein is 55 to 75 wt% of the formulations therein. Asano et al. does not teach boehmite, much less an amount of boehmite. This teaches away from at least Claims 2, 3, 19 (in part[1]), 21-22, and 23 (in part[1]), which are directed to ranges for the amount of boehmite in the formulation. The ranges in Claims 2, 3, 19, 21-22, and 23 have an upper limit of about 50 parts boehmite per hundred parts of epoxy resin, and these claims are thus nonobvious for this additional reason.

Since the purposes and the resins of Asano et al. and Prescher et al. are quite different, as well as the ingredients used, it would not have been obvious to one of skill in the art to employ the boehmite aluminum hydroxide of Prescher et al. in the epoxy resins of Asano et al.

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[1] For clarity, the term "in part" is used to recognize that multiple-dependent Claims 19 and 23 depend from both claims containing the feature described as well as depending from a claim which does not have the feature described.

Furthermore, at least one of the benefits of boehmite mentioned by Prescher et al. and reiterated in the present Office Action (Page 3, lines 3-6) –extrusion speed– is not critical to the formation of laminated boards (the end use of the phosphorus-containing epoxy resin in Asano et al.).

Moreover, unexpected results have been obtained in the present case. Example 4 and corresponding Table 6 (Pages 12-13 of the Specification) compare resins advanced with phosphorus 1) without an aluminum compound, 2) blended with aluminum trihydrate, and 3) blended with boehmite. The sample in which aluminum trihydrate was included showed a 14° decrease in the temperature for 5% weight loss as compared to the resin without an aluminum compound. In sharp contrast, using boehmite significantly increases the temperature for 5% weight loss as compared to the resin without an aluminum compound (19° increase), and even more so in comparison to the resin in which aluminum trihydrate was included (33° increase). The fact that boehmite *increases* the temperature for 5% weight loss, especially because aluminum trihydrate decreases the temperature for 5% weight loss, is clearly unexpected.

For all of the foregoing reasons, this rejection should be reconsidered and withdrawn.

Rejection under §103(a) Asano et al. in view of Prescher at al. and Okamoto et al.

Claims 24-25, 28 and 31 stand rejected under 35 U.S.C. §103(a) as obvious over Asano et al. in view of Prescher at al. and Okamoto et al. (U.S. 4,224,302). Applicants respectfully request reconsideration of this rejection.

All of the remarks made in the discussion above of the §103(a) rejection of Claims 1-3, 19-23, 26-27, and 29-30 over Asano et al. in view of Prescher at al. apply equally here. As mentioned above, Asano et al. does not teach boehmite, thus Asano et al. cannot possibly teach or suggest properties of boehmite, such as particle size, specific surface area, or bulk density. Prescher et al. does not teach anything regarding the bulk density of the boehmite described therein. In addition, the mean grain sizes of the boehmite reported in Prescher et al., a d_{50} of 0.4 μm to 0.7 μm, are quite divergent from the particle size in Claims 28 and 31 (d_{50} in the range of 1 ± 0.2 μm).

Okamoto et al. does not cure the disclosure deficiencies of Asano et al. and/or Prescher at al., nor does Okamoto et al. ameliorate any of the teaching away in Asano et al. and/or Prescher at al. The disclosure of Okamoto et al. teaches the formation of boehmite and of α-alumina. Okamoto et al. is directed to catalyst carriers having a network structure (column 3, lines 15-16) for use in automobile exhaust gas purification (column 2, lines 21-26); no flame retardant applications are suggested for the boehmite or for the α-alumina.

Furthermore (even assuming the combination were viable), it would not have been obvious to one of ordinary skill in the art to use the boehmite taught in Okamoto et al. in formulating the epoxy resins of Asano et al. in view of Prescher et al. The desirable properties referred to in Okamoto et al., e.g., the "catalyst carrier high in strength" (abstract) do not refer to the boehmite therein, but to the α-alumina. At column 1, lines 19-25, Okamoto et al. discusses γ-alumina, which is already known in the art. Examples VI-IX of Okamoto et al. teach the formation of **α-alumina**, and the properties of the formed α-alumina are summarized in Table 1 (column 7) of Okamoto et al. Examples I-V of Okamoto et al. teach the formation of boehmite; no properties of the boehmite are disclosed. Thus, the teachings in Okamoto et al. regarding specific surface (area) and bulk density are for **α-alumina**, *not* for boehmite. The disclosure of Okamoto et al. would not have assisted in any way to make Claims 24-25, 28, and 31 obvious to one of skill in the art.

For all of the foregoing reasons, this rejection should be reconsidered and withdrawn.

In light of the foregoing remarks, the case is believed to be in condition for allowance. Prompt notification to this effect would be sincerely appreciated.

However, if any matters remain that require further consideration, the Examiner is requested to telephone the undersigned at the number given below so that such matters may be discussed, and if possible, promptly resolved.

Please continue to address all correspondence in this Application to Albemarle Corporation at the address of record.

Respectfully submitted,

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